

The Canadian Entomologist.

LXXIV

DECEMBER, 1942

No. 12

THE SCIENTIFIC NAME OF THE COMMON BLUE MUD-DAUBER (HYMENOPTERA, SPHECIDAE)

BY V. S. L. PATE,
Cornell University, Ithaca, New York.

The common blue mud-dauber of the United States and Canada is generally known as either *Chalybion caeruleum* Linnaeus or *Chalybion cyaneum* Fabricius (or Klug or Dahlbom). Both names are incorrect. This wasp was first described as *Sphex caerulea* by Johansson or Linnaeus in 1763 (Amoenitates Academicae, VI, p. 412). Subsequently in 1767, Linnaeus listed it as the second species of *Sphex* in the twelfth edition of his *Systema Naturae*. But as Fernald has shown in discussing the nomenclatorial history of *Chlorion cyanum* Dahlbom, 1843*, *Sphex caerulea* Johansson (or Linnaeus), 1763, a Nearctic form originally described from Philadelphia, is a homonym of *Sphex caerulea* Linnaeus, 1758, a South American species, which Linnaeus also lists in the twelfth edition as the thirty-eighth species of *Sphex*. Thus the common Nearctic *Chalybion* cannot be called *caeruleum*. Apparently aware of this, Fabricius renamed the species *Sphex cyanea* in 1775 (Syst. Ent., p. 346), and it was upon this name that Dahlbom in 1843 based his *Chalybion cyaneum*. But bibliographers and investigators alike have overlooked the fact that *Sphex cyanea* Fabricius, 1775, is a homonym of *Sphex cyanea* Linnaeus, 1758 [= *Chrysis (Trichrysis) cyanea* (L.)]. Thus Fabricius' name *cyanea* cannot be applied to the common Nearctic *Chalybion*, and another name must be found for this mud-dauber.

In addition to *caerulea* Johansson (or Linnaeus), 1763, and *cyanea* Fabricius, 1775, three other specific names have been applied to Nearctic *Chalybia*: *Chalybion Zimmermanni* Dahlbom, 1843; *Pelopeus (Chalybion) californicus* Saussure, 1867; and *Pelopoeus texanus* Cresson, 1872. Under the generic name *Sceliphron*, Dalla Torre in his *Catalogus Hymenopterorum* lists the last three as distinct species and records the present form as *Sceliphron caeruleum* Linnaeus, 1758, but under that name has confused several different species: *Sphex caerulea* Linnaeus, 1758 (Syst. Nat., Ed. X, p. 571, no. 22), a South American form probably referable to *Pepsis*; *Sphex caerulea* Linnaeus (or Johansson), 1763 (Amoen. Acad., VI, p. 412, no. 90), the present Nearctic species; and *Sphex caeruleana* Drury, 1773 (Ill. Nat. Hist. Ex. Ins., II, p. 74, pl. 39 fig. 4), an African form described from the Bight of Benin. Curiously enough, however, Dalla Torre does not list *Sphex caerulea* Drury, 1773 (Ill. Nat. Hist., Ex. Ins., II, p. 75, pl. 39, fig. 8), which Drury evidently meant to apply to the present Nearctic blue mud-dauber since he lists it from New York, but for which he gives the bibliographic citation: [Linnaeus, Syst. Nat., Ed. XII, p.] 947, no. 38—the wrong *caerulea*, i. e. *Sphex caerulea* Linnaeus, 1758.

In 1919, Hutson presented a review of the North American species of *Chalybion* under the generic name *Sceliphron*†. Two species were recognized as valid: *Sceliphron* [i. e. *Chalybion*] *Zimmermanni* Dahlbom, 1843, of which *Pelopoeus texanus* Cresson, 1872, was recorded as a synonym, and *Sceliphron cyaneum* Klug, 1801. But from the bibliographic citations given by Klug,

*Ent. News, XV, pp. 177-120, (1904). V. et. Ann. Ent. Soc. Amer., XXIV, pp. 439-440; 450, 1931).

†Hutson, J. C. The North American species of the genus *Sceliphron*. Trans. Amer. Ent. Soc., XLV, pp. 203-227, (1919).

it is obvious that his *cyaneum* is referable to *Sphex cyanea* Fabricius, 1775, and *Sphex caerulea* Johansson (or Linnaeus), 1763. As a synonym of *Sceliphron cyaneum* Klug (i. e. *Chalybion cyaneum* (Fabricius), 1775), Hutson lists *Pelopeus (Chalybion) californicus* Saussure, 1867, and, since I have been unable to find in the literature any other name earlier than Saussure's which may properly be applied to the present species, our common blue mud-dauber must henceforth be known as *Chalybion californicum* (Saussure).

The pertinent synonymy of the present species follows:

***Chalybion californicum* (Saussure)**

1763. *Sphex caerulea* Johanssen & Linnaeus, Amoenitates Academicae, VI, p. 412, no. 90; [not Linnaeus, 1758]. (Habitat in Philadelphia)
1767. *Sphex caerulea* Linnaeus, Syst. Nat., Ed. XII, p. 941, no. 2; [not Linnaeus, 1758]. (Habitat in America septentrionali.)
1773. *Sphex caerulea* Linnaeus: DeGeer, Mem. Hist. Insect., III, p. 589, no. 6, tab. 30, fig. 6; [not Linnaeus, 1758]. (Pennsylvaniae.)
1775. *Sphex cyanea* Fabricius, Syst. Ent., p. 346, no. 5; [new name for *Sphex caerulea* Johansson & Linnaeus, 1763; but not *Sphex cyanea* Linnaeus, 1758 = *Chrysis cyanea* (L.)]. (Habitat in America septentrionali.)
1781. *Sphex cyanea* Fabricius, Spec. Insect., p. 443, no. 6; [not Linnaeus, 1758]. (Habitat in America boreali.)
1793. *Sphex cyanea* Fabricius, Entom. Syst., II, p. 201, no. 13; [not Linnaeus, 1758].
1801. *Sceliphron cyaneum* [Fabricius]: Kiug, Neu. Schrift. Ges. naturf. Berlin, III, p. 566, no. 4; [not Linnaeus, 1758]. (Das Vaterland ist nordamerika.)
1805. *Pepsis cyanea* Fabricius, Syst. Piez., p. 211, no. 17. (Habitat in America boreali.)
1843. *Chalybion cyaneum* Fabricius: Dahlbom, Hymen. Europ., I, p. 22, no. 3; [not Linnaeus, 1758]. (Habitat Americae utriusque frequens.)
1845. *Pelopeus caeruleus* Linnaeus: Lepeletier, Hist. Nat. Hymen., III, p. 320, no. 20; [not Linnaeus, 1758]. (Caroline.) [Confused with the following; bibliographic citation essentially same for both.]
1845. *Sphex cyanea* Fabricius: Lepeletier, Hist. Nat. Hymen., III, p. 336, no. 4; [not Linnaeus, 1758]. (Philadelphia.) [Confused with the preceding; bibliographic citations essentially same for both.]
1867. *Pelopeus (Chalybion) coeruleus* Linnaeus: Saussure, Reise d. Novara, Zool., II, p. 26, no. 1; [not Linnaeus, 1758]. (♀, ♂; America septentrionalis, Mexico temperata.)
1867. *Pelopeus (Chalybion) californicus* Saussure, Reise d. Novara, Zool., II, p. 26, no. 3. (♀, ♂; California.)
1919. *Sceliphron cyaneum* Klug [i. e. Fabricius, 1775 nec Linnaeus, 1758]: Hutson, Trans. Amer. Ent. Soc., XLV, p. 219.
- (1918?) *Sceliphron (Chalybion) coeruleum* Linnaeus: Kohl, Ann. K. K. Naturhist. Hofmus. Wien, XXXII, p. 57, (1919?). [= *Sphex caerulea* Linnaeus (or Johansson), 1763, nec Linnaeus, 1758. Synonymy confused and evidently merely quoted from Dalla Torre, Catal. Hymen., VIII, p. 381-382, (1897).]

As noted above, the original material upon which Johansson (or Linnaeus) based *Sphex caerulea*, 1763, came from Philadelphia. The only locality data given in connection with *Pelopeus californicus* Saussure, 1867, is merely "California". Saussure's types, which are probably at Geneva, apparently have not been examined by any subsequent investigator (Fernald, Kohl, Hutson, Schulz, etc.), and consequently the above synonymy is entirely dependent upon an eventual study of Saussure's types and comparison of them with material from the eastern United States. However, Hutson was unable to find any tangible external characters wherein the eastern specimens of the present species differed from California material. I have examined the male genitalia of specimens from various localities in California and find no essential difference from those from various places in the east. Consequently, at the present juncture, I believe the above synonymy to be correct and see no course but to employ Saussure's name *californicum* for the common blue mud-dauber.

The male genitalia of *Chalybion zimmermanni* Dahlbom (in the present accepted sense) have also been examined and found to be quite distinct from those of *californicum*, thus removing Dahlbom's name as a possible one which might be applied to the present species.

HOST PLANTS AND PARASITES OF SOME LEPIDOPTEROUS LARVAE*

BY WM. L. PUTMAN,
Dominion Entomological Laboratory,
Vineland Station, Ont.

A list of the host plants and parasites of lepidopterous larvae reared during a study of the native hosts of parasites of the oriental fruit moth, *Grapholitha molesta* Busck, was published in 1935. Much additional data which have since accumulated appear worth placing on record, particularly the host relations of the parasites. Information on larval habits, etc., given in the previous paper will not be repeated here. Determinations were made by the specialists of the Division of Entomology, Ottawa: Lepidoptera by Dr. J. H. McDunnough and Mr. T. N. Freeman; Ichneumonoidea by Mr. G. S. Walley; Chalcidoidea by Dr. O. Peck; and Diptera by Mr. A. Brooks. The co-operation given by these gentlemen has been much appreciated. Thanks are also due to Mr. E. W. Hart of the Division of Botany and Plant Pathology for the determination of some *Aster* and *Solidago* species.

The numbers of the Lepidoptera follow those of Dr. McDunnough's 1938-1939 Check List. Botanical nomenclature is that of Gray's Manual, Seventh Edition. Unless otherwise stated, all collections were made in the vicinity of Vineland Station, Ontario. The dates refer to the emergence of adults.

PHALAENIDAE

2711 *Achatodes zae* Harr. July 24, 1936. In twigs of *Sambucus nigra*.
 3235 *Sarrothripus revayana* Scop. July 14-24, 1936 and 1940. Young larvae colonial, webbing terminal shoots of *Salix* and *Populus* spp. Parasites: *Dioces obliteratus* (Cress.), July 17, 1936.
 3807 *Palthis angulalis* Hbn. August 4, 1938. On *Spiraea van houtei*.

PYRALIDAE

5355 *Desmia funeralis* Hbn. June 21-July 3, 1937. On *Psedera quinquefolia*.
 5397 *Pantographa limata* G. & R. July 10-26, 1936 and 1940. On *Tilia americana*. Parasites: *Phorocera erecta* Coq., July 19-21, 1940.
 5448 *Crocidiophora serratissimalis* Zell. July 5-9, 1938. Larva on *Leersia oryzoides* and *L. virginica*, within a tube formed by sewing together the edges of a leaf.
 5479 *Loxostege commixtalis* Wlk. June 30, 1936. On *Aster novae-angliae*.
 5563 *Phlyctaenia helvalis* Wlk. August 9 and 10, 1936. Leaf roller on *Populus tremuloides*.
 5564 *Phlyctaenia tertialis* Gn. July 11, 1938. Larvae webbing leaves of *Sambucus canadensis*.
 5576 *Pyrausta pertextalis* Led. Beamsville and Vineland Station, June 28-July 9, 1937, 1938 and 1941. Larvae rolling leaves of *Aster* spp., *Viola* spp., and apparently other low plants. Parasites: *Campoplex militaris* Vier., July 7, 1941; *Phorocera erecta* Coq., July 4-8, 1941.
 5601 *Pyrausta futilalis* Led. August 2-5, 1935. Larvae colonial in younger stages, in a web on *Apocynum androsaemifolium*.
 5625 *Pyrausta ochosalis* Dyar. July 17, 1936. Webbing leaves of *Mentha piperita*.
 5633 *Pyrausta signatalis* Wlk. July 13, 1938. Leaf roller on *Monarda mollis*.
 6079 *Acrobasis kearfottella* Dyar. Parasite: *Scambus indagator* (Cress.), July 4, 1941.
 6082 *Acrobasis juglandis* Le Bar. July 3-22, 1940 and 1941. Larva in tapering case on petiole of *Juglans nigra*. Parasite: *Scambus indagator* (Cress.), June 29, 1941.

*Contribution No. 2167, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

†Can. Ent. 67:105-109. 1935.

6094 *Acrobasis sylviella* Ely. July 14-25, 1940. Parasites: *Exochus apicalis* Cress., July 19-31, 1940; *Meteorus indagator* (Riley), July 6-8, 1940; *Hyposoter comptoniellae* Vier., July 1-13, 1940.

6100 *Acrobasis caryaef* Grt. July 9, 1935 and 1937. Larvae boring in bases of young twigs of *Carya cordiformis*; a small tubular case over the entrance.

6115 *Mineola indigenella* Zell. July 18-20, 1938. Larva in long, tortuous case on twigs of *Prunus americana*.

6184 *Meroptera pravella* Grt. June 5-29, 1936. Leaf roller on *Populus tremuloides*.

6205 *Salebria virgatella* Clem. June 23, 1936. Leaf roller on *Robinia Pseudo-Acacia*.

6372 *Homoeosoma reliquellum* Dyar. June 8-10, 1937. Larvae in flower heads of *Aster novae-angliae*.

PTEROPHORIDAE

6561 *Oidaematophorus homodactylus* Wlk. July 6-20, 1935. On *Solidago altissima*.

6568 *Oidaematophorus lacteodactylus* form *kellicottii* Fish. June 11-26, 1936. Boring in bases of stems and rhizomes of *Aster paniculatus*.

OLETHRUTIDAE

6592 *Episimus argutanus* Clem. First brood, May 29-June 23; second brood, August 1-17; 1934, 1936 and 1939. On *Rhus typhina*, *R. toxicodendron* and *R. cotinus*. Parasites: *Sympiesis dolichogaster* Ashm., August 29, 1936; *Exochus dorsalis* Cress., August 15-22, 1939; *Diocles oblitteratus* (Cress.), August 4, 1939; *Meteorus trachynotus* Vier., July 31-August 7, 1939; *Bassus calcarius* (Cress.), August 15-25, 1939; *Phorocera erecta* Coq., August 6-9, 1939; *Perilampus fulvicornis* Ashm., a hyperparasite emerging from isolated cocoons of *Meteorus trachynotus*, August 15-25, 1939.

6613 *Polychrosis slingerlandana* Kft. June 23-July 3, 1937. In inflorescence of *Eupatorium purpureum*.

6629 *Endothenia antiquana* Hbn. June 14-July 15, 1938. Boring in bases of stems of *Stachys palustris*. Emerging from the same material were a few specimens of another *Endothenia*, tentatively placed by Dr. McDunnough as near *montanana* Kft.

6656 *Phaecasiophora niveiguttana* Grt. St. Davids, June 4-13, 1936. Leaf roller on *Sassafras variifolium*. Parasite: *Microgaster ecdytolophae* Meus., October 6, 1935.

6670 *Exartema punctatum* Wlshm. (=cornanum of previous paper). Parasite: *Hypopteromalus inimicus* Mues., St. Davids, June 29, 1934.

6671 *Exartema connectum* McD. July 3-17, 1936. On *Cornus paniculata*.

6672 *Exartema inornatum* Clem. Parasite: *Microgaster canadensis* Mues., Vineland Station, June 14-July 8, 1938.

6679 *Exartema tilianum* Heinr. June 28-July 5, 1941. On *Tilia americana*.

6685 *Exartema merrickanum* Kft. In addition to *Hamamelis*, this species has also been reared from *Ostrya virginiana*, June 20-22, 1938.

6715 *Olethreutes agilana* Clem. June 24-July 21, 1936. In stems of *Impatiens biflora*.

6743 *Evora hemidesma* Zell. August 21-Sept. 8, 1938. Leaf roller on *Spirea van houtei*.

6744 *Pseudogalleria inimicella* Zell. June 7-14, 1936. In bases of stems of *Smilax herbacea*.

6772 *Thiodia essexana* Kft. St. Davids, June 6-29, 1935; Vineland Station, June 24-28, 1937. Boring in stems of *Aster novae-angliae*. The larvae of

this and all the following species of *Thiodia* leave their feeding quarters and overwinter as mature larvae in cocoons spun in the soil or among debris, pupating the following spring or summer.

6778 *Thiodia formosana* Clem. St. Davids, July 1 and 2, 1935; Vineland Station, June 24, 1937. Larva in a case formed of the terminal leaves of *Solidago altissima*, and boring in the apex of the stem. From one of the same collections a closely related form, probably *ferruginana* Fern., emerged on June 17, 1937; apparently more than one species have larval habits of this type.

6787 *Thiodia ochroterminana* Kft. August 19-24, 1935. Larva on *Solidago altissima*, webbing together several flower heads and feeding inside.

6788 *Thiodia perfusana* Heinr. July 8, 1935. In flower heads of *Aster macrophyllus*.

6790 *Thiodia alterana* Heinr. July 22-August 25, 1936 and 1937. In flower heads of *Aster macrophyllus* and *A. paniculatus*.

6794 *Thiodia tomonana* Kft. August 24, 1935; August 23, 1937. In flower heads of *Aster novae-angliae*.

6808 *Thiodia ornatula* Heinr. July 23-26, 1937. In flower heads of *Lactuca spicata*.

6972 *Eucosma dorsisignatana* form *similana* Clem. August 25-Sept. 7, 1936. In rhizomes of *Solidago altissima*.

6982 *Eucosma sombreana* Kft. July 22, 1936. In bases of stems of *Helianthus* sp. Small lepidopterous larvae were present in the flower heads in August, whereas *sombreana* could not be found boring in the stems until some time later. The identity of the larvae in the flowers was not established by rearing, but may possibly have been *E. sombreana*, the larvae not entering the stems until after they have fed for some time in the flowers, as in the case of *Epiblema carolinana**.

7004 *Eucosma cataclystiana* Wlk. August 14, 1936. Boring in the bases of stems and in rhizomes of *Solidago graminifolia*.

7014 *Epiblema strenuana* Wlk. Moths that appeared to be identical in every respect with this common ragweed borer were reared from larvae in the stems of *Xanthium* sp. on August 19-Sept. 3, 1936. The parasites, *Cremastrus minor* Cush. and *Bassus simillimus* (Cress.) recovered from the *Xanthium* material are both common on the ragweed borer.

7027 *Epiblema scudderiana* Clem. June 1-July 4, 1935. In a fusiform gall on stems of *Solidago altissima*; by far the most abundant lepidopterous goldenrod gall-maker in the vicinity of Vineland Station. Parasites: *Apanteles cacoeciae* Riley, June 1-3, 1935; *Glypta rufiscutellaris* Cress., Sept. 13, 1934; *Bassus simillimus* (Cress.), July 2, 1935; *Epiurus pterophori* Ashm., May 31, 1935.

7030 *Epiblema obfuscana* Dyar. June 7-July 10, 1935 and 1936. The young larva enters the stem of *Solidago altissima* a few inches below the tip, and by tunnelling horizontally about the stem, girdles it and causes the death of the upper part. The larva then tunnels slowly down to the base where it overwinters below the level of the soil. All *Epiblema* species reared hibernated as mature larvae within their feeding tunnels. Parasites: *Bassus simillimus* (Cress.), June 28 and 29, 1935; July 1, 1936; *Macrocentrus pallisteri* De Gant, June 29, 1935; *Glypta rufiscutellaris* Cress., June 15, 1936.

7032 *Epiblema carolinana* Wlshm. July 18-August 29, 1936. In bases of stems of *Rudbeckia laciniata*.

7044 *Epiblema otiosana* Clem. This well-known borer in *Bidens* was reared from stems of *Ambrosia artemisiifolia*, July 3, 1936.

*Thompson, R. W. 1928. 58th Annu. Rept. Ent. Soc. Ont. pp. 73-75.

7053 *Suleima cinerodorsana* Heinr. July 20—August 25, 1936 and 1937. In stems of *Helianthus* sp.

7055 *Sonia canadana* McD. July 9—August 24, 1936. In underground parts of stems of *Aster novae-angliae*.

— *Pseudexentera caryana* McD. April 14-18, 1938. Leaf roller on *Carya ovata*, maturing in June and entering the soil to spin up.

7158 *Epinotia acerella* Clem. May 23-25, 1936. Larva within a tube, skeletonizing the under surface of leaves of *Acer saccharum*. In rearing cages they spun oval cocoons between fallen leaves and pupated in autumn.

7161 *Epinotia nanana* Tr. Spruce Needle Miner. June 19—July 10, 1935. Very common on *Picea Abies*. Parasite: *Hypopteromalus inimicus* Meus., May 1-10, 1935.

7172 *Epinotia lindana* Fern. August 24, 1938. Leaf roller on *Cornus paniculata*.

7183 *Anchylopera spireaefoliana* Clem. July 29—August 20, 1935 and 1938. The larvae fold the leaves or tie pleats between the lobes. Parasite: *Diocles oblitteratus* Cress., July 30—August 2, 1935.

7196 *Ancylis muricana* Wlshm. Adults of this species, always in very small numbers, emerged from collections of cultivated strawberry leaves infested with the strawberry leaf roller, *Ancylis comptana* Froel., May 25-31, 1935; August 6, 1936.

7223 *Dichrorampha littoralis* Busck. June 17-27, 1936. Larvae feeding in or on the rhizomes of *Aster paniculatus*.

7244 *Grapholitha packardi* Zell. July 18—August 6, 1936; August 12-27, 1937. Boring in tips of shoots and in buds of cultivated roses.

7300 *Melissopus latiferreanus* Wlsm. June 1—July 22, 1935. In acorns of *Quercus rubra*. Parasite: *Glypta rufiscutellaris* Cress., June 28, 1935.

7304 *Ecdytolopha insiticiana* Zell. July 16-29, 1940. In twigs of *Robinia Pseudo-Acacia*. Parasites: *Microgaster ecdytolophae* Mues., June 18 and 19, 1940; *Perilampus fulvicornis* Ashm., July 15-19, 1940.

TORTRICIDAE

7317 *Sparganothis petitana* Rob. Parasites: *Dimmockia incongrua* (Ashm.), St. Davids, June 23, 1934.

— *Sparganothis putmanana* Freeman. St. Davids, June 19—July 7, 1932, 1934, 1937. Leaf roller on *Solidago altissima*, *Aster novae-angliae* and other sp., *Rosa blanda*, *Prunus serotina*, *Rubus* spp. and *Quercus rubra*. Parasites: *Cremastus epagoge* Cush., June 19-25, 1934.

7369 *Platynota idaealis* Wlk. July 4, 1935. Leaf roller on *Rubus strigosus*.

7383 *Archips fervidana* Clem. June 29—July 9, 1938. Larvae colonial, in a nest similar to that of *Archips cerasivorana*, on *Quercus rubra*. Appears to be very scarce in the Niagara Peninsula.

7398 *Archips rosana* Linn. Very abundant on a privet hedge in Vineland for several years; also on *Caragana arborescens*. Parasites: *Microgaster canadensis* Mues., July 2-5, 1935; July 6, 1940; *Zenillia caesar* Ald., July 8 and 9, 1940; *Phorocera erecta* Coq., July 13-15, 1940.

7399 *Archips purpurana* Clem. Parasites: *Macrocentrus nigridorsis* Vier., July 5-9, 1938; *Oncophanes atriceps* (Ashm.), June 25, 1938; *Microgaster canadensis* Mues., June 14—July 8, 1938.

7516 *Peronea cornana* McD. August 13, 1938; June 26—July 2, 1939. On *Cornus paniculata*.

PHALONIIDAE

7558 *Phalonia bunteana* Rob. July 21-24, 1936. In flower heads of *Lactuca spicata*.

7562 *Phalonia marloffiana* Busck. August 14-27, 1937. In flower heads of *Aster novae-angliae*.
 7567 *Phalonia oenotherana* Riley. August 1-Sept. 9, 1935 and 1939. In flower buds of *Oenothera biennis*.

CARPOSINIDAE

7627 *Carposina fernaldiana* Busck. August 11-Sept. 1, 1937. In fruit of *Crataegus* spp.

COSMOPTERYGIDAE

7749 *Mompha stellella* Busck. Sept. 9-16, 1935. In flower buds of *Oenothera biennis*.

GELECHIIDAE

7898 *Recurvaria nanella* Hbn. July 6-13, 1936. On apple, with a collection of *Spilonota ocellana* D. & S.

8089 *Gelechia vernella* Murt. St. Davids and Vineland Station, June 22-July 8, 1935 and 1938. Tying leaves of *Quercus rubra* and *Quercus alba*. Parasite: *Asphragis mirabilis* (Cress.), July 8-12, 1937; July 5 and 6, 1938.

8153 *Gnorimoschema gallaesolidaginis* Riley. August 11-Sept. 18, 1936. In gall on stem of *Solidago altissima*; generally uncommon locally. Parasites: *Copidosoma gelechiae* Haw., Sept. 9, 1936; *Sesioplex depressus* Vier., May 26-June 1, 1937.

8284 *Onebala alacella* Clem. July 6-12, 1935-1937. Folding over the margin of a leaf on *Solidago altissima*, *Aster cordifolius* and *A. paniculatus*. Parasite: *Lissonota marginata* (Prov.), July 3, 1937.

8319 *Trichotaphe flavocostella* Clem. Parasite: *Lissonota marginata* (Prov.), June 27-July 5, 1937.

8331 *Trichotaphe levicella* Fyles. July 1-7, 1937. Folding over the margin of a leaf on *Aster paniculatus* and *A. cordifolius*.

OECOPHORIDAE

8383 *Machimia tentoriferella* Clem. August 24-Sept. 23, 1935 and 1937. On *Robinia Pseudo-Acacia*, *Tilia americana* and *Cornus paniculata*, beneath a web across the underside of a leaf.

8448 *Agonopterix robinella* Pack. July 2-5, 1938. Leaf roller on *Robinia Pseudo-Acacia*.

AEGERIIDAE

8755 *Synanthedon pyralidiformis* Wlk. July 22-August 2, 1936. In bases of stems of *Eupatorium perfoliatum*.

PLUTELLIDAE

8866 *Acrolepia incertella* Cham. April 14-16, 1938. Larvae boring into fruit of *Smilax herbacea*, overwintering as pupae in lace cocoons on the pedicels.

8870 *Plutella porrectella* Linn. May 23-June 15, 1936. Webbing young shoots of *Hesperis matronalis*.

YPONOMEUTIDAE

8931 *Yponomeuta multipunctella* Clem. July 8-17, 1935 and 1940. In a loose web on *Evonymus obovatus*. Parasite: *Nemorilla maculosa* Meig., July 13, 1940.

GRACILLARIIDAE

9361 *Gracillaria burgessiella* Zell. Two broods; June 2, August 2-26, 1935, 1936, 1938. Leaf roller on *Cornus paniculata*. Parasite: *Apanteles ornigis* Weed, Sept. 16, 1935; June 2-7, 1936.

9375 *Gracillaria stigmatella* Fabr. Sept. 23, 1935. On *Populus tremuloides*.

9398 *Gracillaria cuculipennella* Hbn. July 15-18, 1940. On *Fraxinus americana*.

LYONETIIDAE

9429 *Buccalatrix magnella* Cham. July 12-16, 1935. Larvae boring into the terminal buds on stems of *Solidago altissima*.

PRODOXIDAE

9823 *Prodoxus quinquepunctellus* Cham. July 9-23, 1936. Larvae in flower stalks of *Yucca filamentosa*; adults are often very numerous within the flowers.

9834 *Tegeticula alba* Zell. July 29, 1940. Larvae in seed capsules of *Yucca filamentosa*. Much less common than *Prodoxus*.

TWO UNDESCRIPTED CANADIAN MICROLEPIDOPTERA*

BY J. McDUNNOUGH,

Ottawa, Ont.

Elachista maritimella n. sp.

Venation as in Meyrick's figure (Handbook Brit. Lep. 712) except that on primaries vein 9 is connate with the stalk of 6-8 from apex of cell. Unicolorous light ochre-yellow. Head and palpi somewhat paler than forewings. Antennae faintly smoky with traces of brown annulations. In well marked specimens the forewings show the merest traces of irregular, whitish, median and subterminal bands. Secondaries pale smoky. Fringes on both wings light yellowish. Abdomen yellowish, including anal tuft. Traces of smoky shadings on pectus and basal portions of legs. Expanse 9-10 mm.

Holotype—♂, Bathurst, N. B., June 24, 1941, (J. McDunnough); No. 5269 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, June 26.

Paratypes—9 ♂, 1 ♀, same data (J. McDunnough and T. N. Freeman).

The series was taken on the salt coastal meadows a few miles north of Bathurst. I can find no description of any North American species which would fit our specimens but the species would seem (following Meyrick's key) to be allied to the European *subalbidella* Schlag.

Seythris epilobiella n. sp.

Head, thorax, legs and primaries deep black, the latter with light sprinkling of white scaling and traces of darker black longitudinal streaks through the cell and along the fold. Secondaries deep smoky. Fringes on both wings blackish. Abdomen dorsally in male paler than forewings, with a somewhat purplish-gray tinge, in female blackish; ventrally in both sexes a strong median suffusion of white scaling, which includes the anal tufting. In the male genitalia the clasper terminates in a long, upturned prong, cephalad of which is a shorter, stouter hook; the aedeagus is a long, thin, slightly curved rod, arising from a bulbous base. Expanse 15-17 mm.

Holotype—♂, Alberton, P. E. I., Aug. 2, 1940, (J. McDunnough) (Bred from *Epilobium*); No. 5270 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—4 ♂, 5 ♀, same data, Aug. 2-7; 5 ♂, Eel River, N. B., July 26, 1941, (T. N. Freeman) (On *Epilobium*).

Larvae of the species were common in both localities, tying up the flower-heads of *Epilobium* into unsightly webs containing a number of larvae. They were heavily parasitized by a tachinid fly of the genus *Psalidopteryx*, probably undescribed, according to A. R. Brooks. Adult specimens submitted to the United States National Museum could not be determined by J. F. Gates Clarke.

*Contribution No. 2190, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

NOTES ON THE LIFE HISTORIES OF FIVE COMMON GEOMETRIDAE

BY V. G. DETHIER,

John Carroll University, Cleveland, Ohio

Although larvae of the five species described below are among those loopers most frequently encountered in numbers, complete data on their life histories are still lacking. The following notes, based on large samples of larvae collected and bred in New England during the past three years, are intended to supplement the accounts of earlier authors and are not in themselves complete.

***Cosymbia pendulinaria* Gn.**

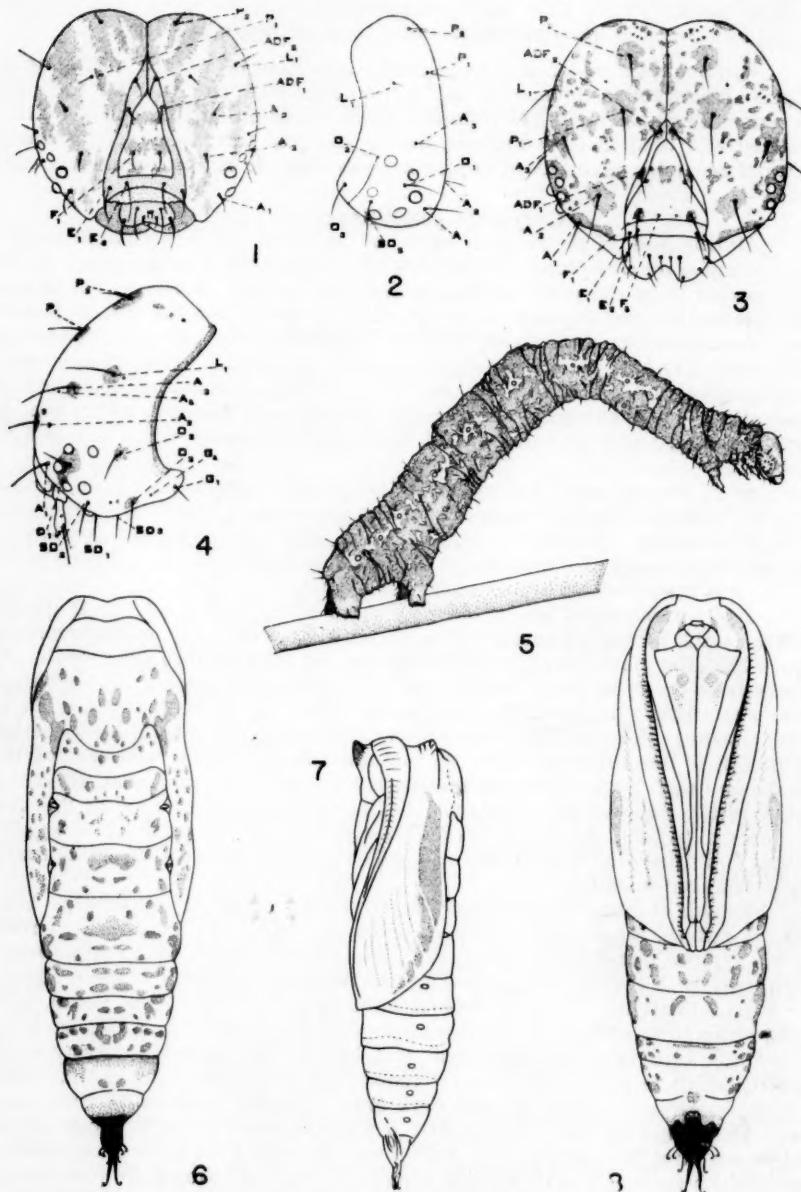
During most of the summer larvae of *Cosymbia pendulinaria* are exceedingly common on *Comptonia asplenifolia* Ait. throughout New England. Sweet fern appears to be the preferred food plant, but species of *Betula*, *Vaccinium*, and *Psoralea* are also reported as acceptable. Larvae of the first brood mature early in the summer and pupate toward the end of July, emerging about two weeks later. Others pupate during the middle of August. Most of the specimens studied pupated during the last week of August and the first week of September. These emerged the following January and February when kept in the laboratory, or with the advent of warm spring weather when kept out-of-doors.

From the second to last instars all larvae are fundamentally similar with regard to pattern. Younger instars appear darker due to a relatively smaller area of light mottling. Frequently, however, one may appear lighter laterally or ventrally on account of a merging of the mottling in these areas. A description of the final instar will serve to identify the species.

Last Instar. Head height 1.25 mm.; head width 1.2 mm. General appearance of head brown. Usually yellowish with nodular rusty brown mottling (plate XIV, fig. 1). The ratio of yellow to brown varies within wide limits. At one extreme the head may possess a yellow to white background upon which is a rusty mottling. At the other extreme the head may be rusty with yellow to white mottling. The exact distribution of the mottling is also subject to change. As indicated the adfrontal areas are pronounced, extending well toward the top of the head. Setae short and transparent. Second posterior setae (P_2) near top of vertex. Second adfrontal setae (ADF_2) nearly at same level as P_1 . Anterior setae (A_1 , A_2 , A_3) form an obtuse angle. Ocelli six (plate XIV, fig. 2). Second and third ocellar lenses most prominent. Area surrounding ocelli white. Surface of head smooth.

Length of body 14 mm. Body cylindrical, more slender anteriorly. General appearance ranges from greenish yellow through yellowish green to rusty brown. Dorsal line thin, irregular, rusty and greenish white. Para-dorsal same. Outlines of both black. Background greenish with a rusty tinge where it adjoins the longitudinal lines. Lateral line at least twice as wide as the dorsal. All longitudinal lines composed of discontinuous patches of rusty white irregular in shape. Area between para-dorsal and lateral line greenish. Rusty tinge adjacent to these lines. Background ventrad of lateral line gray green. Mid-ventral line whitish, outlined with dark gray. Double para-ventral lines composed of small, irregular, disconnected patches of gray. Area between lateral and para-ventral lines gray green. Background between para-ventral and ventral lines whitish green. The dorsal line is more or less continuous; the para-dorsal, less so. The lateral line as seen with the naked eye is a wide band of irregular patches. Prolegs and anal plate rusty. Legs light greenish. Dorsal areas on the whole slightly more rusty than the rest of the body. Spiracles yellowish with dark rims, spherical to oval. Skin smooth. The arrangement of the color pattern is indicated in plate XIV, fig. 5. Body hairs or setae short, colorless. Do

PLATE XIV.



LIFE HISTORIES OF GEOMETRIDAE

not arise from sclerotizations. Abdominal setae I, III, and V in a vertical line except on the first and last segments. Seta VI extremely posterior. Seta VII unisetose on first abdominal segment, bisetose on second, and trisetose on third. Crochets biordinal. Arranged in a semicircle.

Pupa. Length 8 to 9 mm. General appearance indicated in plate XIV, fig. 7. Immediately after the last moult the pupa possesses the same markings as the larva. As these disappear with age the pupa usually becomes entirely light pea green. There may or may not be a fuscous to black dash along the edge of the wing pad. The pupa is typically flat-topped with several conspicuous ridges in the head region. These appear polished as if worn. Ivory in color. Body surface generally smooth.

***Cosymbia pendulinaria* form *nigricaria* Rothke**

As far as can be told this form differs from the foregoing one in the immature stages by color only. All other markings and habits are identical. The larvae are russet to rusty maroon in color. The pupae are pinkish.

***Nepytia canosaria* Wlk.**

In northern New England this species first appears abundantly in early spring. Eggs are laid within a few days of the first appearance. They are affixed, flattened side down, to the terminal twigs of the food plant. Large numbers were found on twigs of the food plant. Large numbers were found on twigs of various species of spruce (*Picea*). Under favorable conditions they hatch in approximately ten days, and the young larvae attack the epidermis of the spruce needles. Noticeable changes in the larvae are restricted to the color pattern which is exceedingly variable. A second and possibly a third brood may appear during the summer during which time all intermingle. The last brood of the season usually overwinters in the pupal stage. Most of the pupae observed in the field were fastened by a few strands in an upright position among and parallel to the spruce needles. Emergence occurs with the return of warm weather.

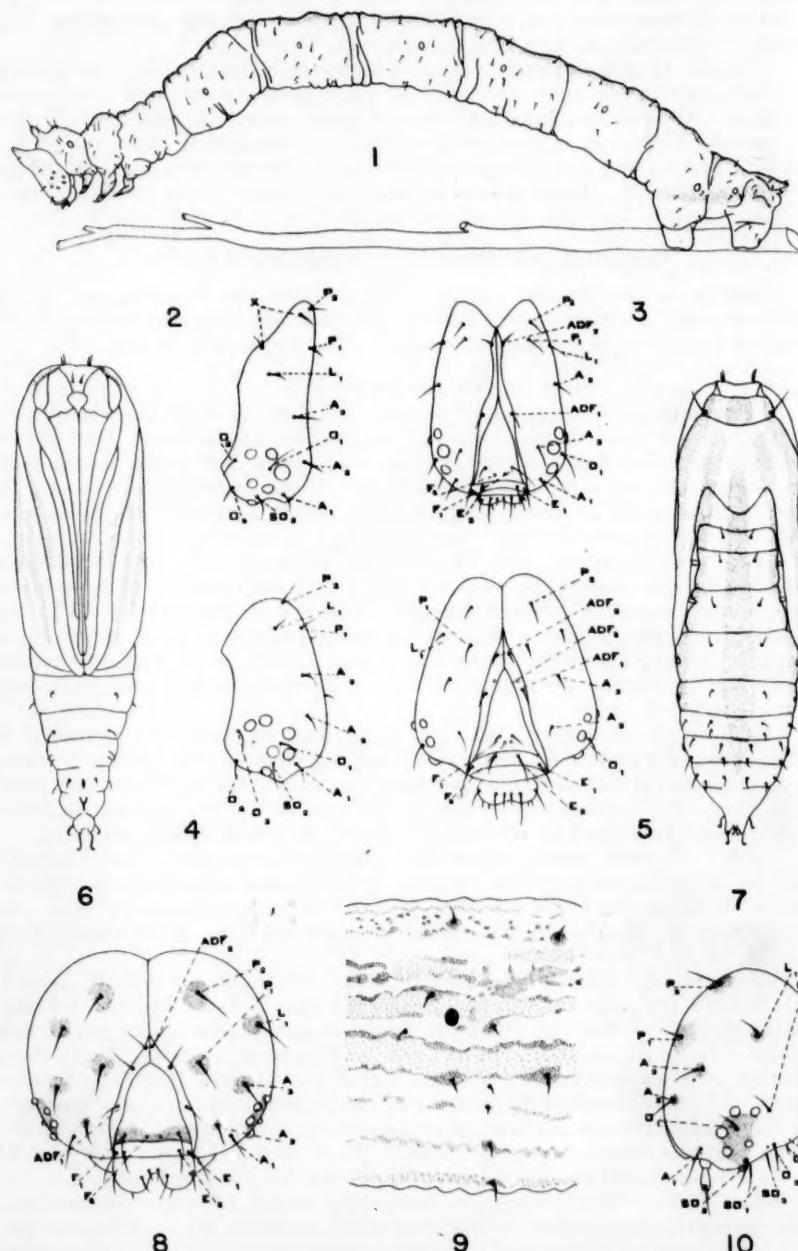
During the summer of 1941 this species was conspicuously abundant in certain parts of the state of Maine. Although spruce was the preferred plant, larvae exhibited a wide degree of independence and would feed on most native shade trees. The incidence of parasitism appeared to be low, but large numbers of larvae were consumed by birds, especially by various species of warblers.

Egg. Greenish brown, concolorous with spruce needles. Laterally compressed. Elliptical when viewed from the top. Circular when viewed from the flattened side. Generally smooth. Sculpturing microscopic, consisting of minute polygonal areas. Height .54 mm. Long diameter .40 mm. Short diameter .30 mm.

First instar. Head height .18 mm.; head width .16 mm. Head smooth, piceous, with few colorless tapering hairs. Length of body 2.5 mm. Transversely striped. Anterior half of each segment white, posterior half fuscous. Irregular fuscous supra- and substigmatal bands. Last three segments faded in appearance. All legs soiled white. Skin smooth. Spiracles fuscous. Crochets biordinal in a single row interrupted by a flap. No secondary hair. Primary setae colorless and tapering and restricted in distribution to the fuscous portions of each segment. Setae I, III, V, and VII nearly in a vertical line on the abdominal segments. Setae II, IV, and VI also nearly in line.

Last instar. Head height 1.6 mm.; head width 1.8 mm. Surface very finely granular, almost smooth. Ground color cream to gray. Markings fuscous. The extent of the markings is subject to considerable variation. Plate XIV, fig. 3 represents a typical color pattern and illustrates the arrangement of the setae. Setae colorless to light brown. Lateral seta (L₁) far back

PLATE XV.



LIFE HISTORIES OF GEOMETRIDAE

on head, equidistant from posterior setae (P_1 and P_2). Anterior setae (A_1 , A_2 , A_3) form a right angle. Second adfrontal setae (ADF_2) nearly at level of A_3 . Frontal punctures (F_a) not close together. Six ocelli well defined (plate XIV, fig. 4). Fifth remote from rest. First ocellar seta (O_1) immediately behind third ocellus. Second ocellar seta (O_2) posterior to first ocellus. Third ocellar seta (O_3) remote. Subocellar setae (SO_1 , SO_2 , SO_3) grouped in a triangle. Genal puncture (G_a) before genal seta (G_1).

Length of body 31 mm. Color pattern as shown in plate XV, fig. 9. Mid-dorsal line light orange. Para-dorsal line, at level of setae I and II, cream with border and other markings of sienna. Suprastigmatal line below setae I and II suffused with yellow. Stigmatal line pink. Markings fuscous. Substigmatal line and ventral areas cream with pink markings. Spiracles fuscous. In general appearance the larva seems to possess a broad pinkish dorsal band with lighter and thinner para-dorsals and a darker stigmatal area. Dorsal and ventral setae located in conspicuous fuscous spots. Setae I and II still retain their posterior position as in the first instar. Seta II slightly more laterad than I. Seta V slightly posterior to III and below IV. Two prespiracular setae (IV and V) on prothorax. Seta VI at the extreme posterior border of the abdominal segments. Additional setae have appeared in the ventral areas. All setae rather short.

Pupa. Length 13.2 mm. Greatest width .40 mm. Surface smooth. Few scattered colorless hairs. Ground color brownish to grayish. Markings variable, fuscous. Region of cremaster nearly black. Other features and typical color pattern illustrated in plate XIV, figs. 6 and 8.

Elloplia fliscellaria Gn.

This species was not nearly so abundant as the foregoing one although the time of appearance of the two coincided. Eggs, first laid four days after emergence, are affixed flattened side down in rows on the upper surface of balsam needles (*Abies balsamea* Marshall). Egg clusters are larger with this species. Larvae emerge ten to fourteen days following oviposition. The color pattern is rather constant after the first instar.

Here also there may be as many as three broods during the summer although there is considerable overlapping. The insect usually hibernates in the pupal stage. Pupae are fastened parallel to the balsam needles by a few strands of silk.

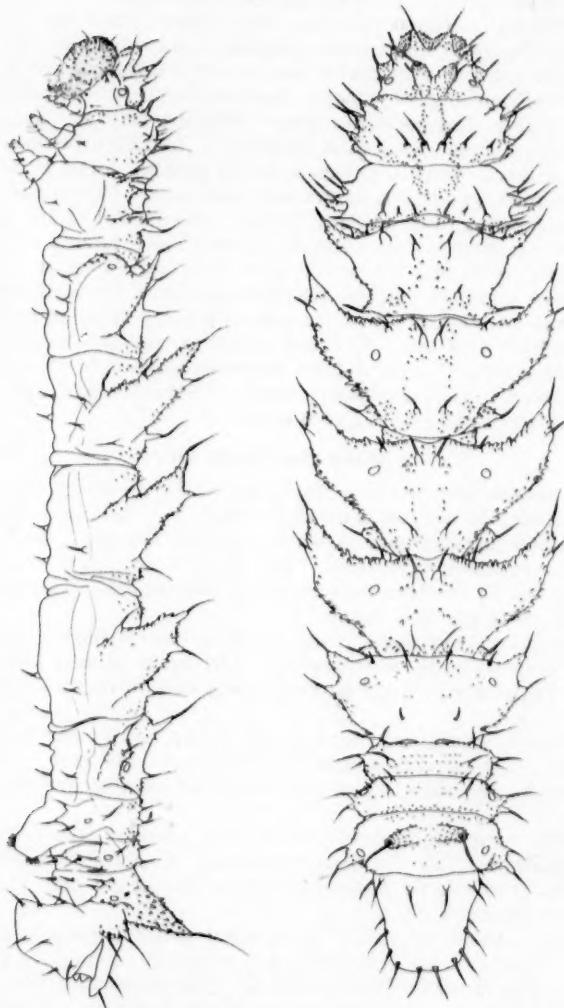
Larvae of this species appeared to be rather rigidly restricted to balsam, nor were they exceptionally numerous even on these trees. Warblers and predacious insects, especially wasps, were observed hunting and destroying numbers of larvae.

Egg. Dull green, concolorous with balsam needles. Laterally compressed. Circular when viewed from the compressed side. Generally smooth with microscopic sculpturing of minute polygonal areas. Height .46 mm. Long diameter .40 mm. Short diameter .30 mm.

First instar. Head height .18 mm.; head width .16 mm. Head smooth, almost shiny. Piceous. Hairs colorless and tapering. Length of body 1.8 mm. Ground color dark brown. Wide, brilliant white stigmatal line. Thin white para-dorsals. Skin smooth. Hairs colorless and spatulate. Arrangement does not differ markedly from that of foregoing species. Spiracles concolorous with body. Crochets biordinal in a single row interrupted by a flap.

Last instar. Head height 1.6 mm.; head width 1.8 mm. Surface very finely granular, bright green. Fuscous dots conspicuous but restricted to areas surrounding the bases of the hairs. Base of clypeus sometimes suffused with fuscous. The arrangement of the setae and typical color pattern is shown in plate XV, figs. 8 and 10. First posterior setae (P_1) very far forward on head. Lateral setae (L_1) equidistant from P_1 and P_2 . Anterior setae (A_1 , A_2 , A_3) form a right

PLATE XVI.



LIFE HISTORIES OF GEOMETRIDAE

angle. A_3 nearer to P_1 than to L_1 . Second adfrontal setae at extreme tip of clypeus. A variable number of setae was found in the adfrontals between ADF_1 and ADF_2 . On many of the specimens examined the head was not bilaterally symmetrical with respect to these extra setae. Frontal punctures (F_a) fairly close together. Arrangement of ocelli, ocellar setae, and subocellar setae similar to that of the foregoing species. Genal punctures (G_a) behind genal setae (G_1).

Length of body 22 mm. Ground color green, concolorous with balsam needles. Thin white para-dorsal line through setae I and II. Wider white substigmatal line through setae IV and V. Edged dorsally with brown. Thin, white, para-ventral line below seta VI. Mid-ventral area between setae VIII of each side white, sometimes suffused with green. Spiracles black. Setae I and II still located near posterior half of segment as in first instar. Seta III anterior and above spiracle on abdominal segments. Seta IV behind and at level of spiracle. Except on the first abdominal segment seta V is nearly directly below the spiracle. Seta VI at extreme posterior border of abdominal segments. Few secondary setae in the ventral areas of the abdominal segments. Setae rather short and colorless.

Pupa. Length 10.8 mm. Greatest width 3.2 mm. Surface smooth. Few scattered hairs as shown in Plate XV, figs. 6 and 7. Ground color greenish. Faint light brown markings in the form of dorsal and para-dorsal bands and lines following the veins in the wing pads. There is little variation in the markings of the pupa though in occasional specimens the brown markings are entirely absent.

Chlorochlamys chloroleucaria Gn.

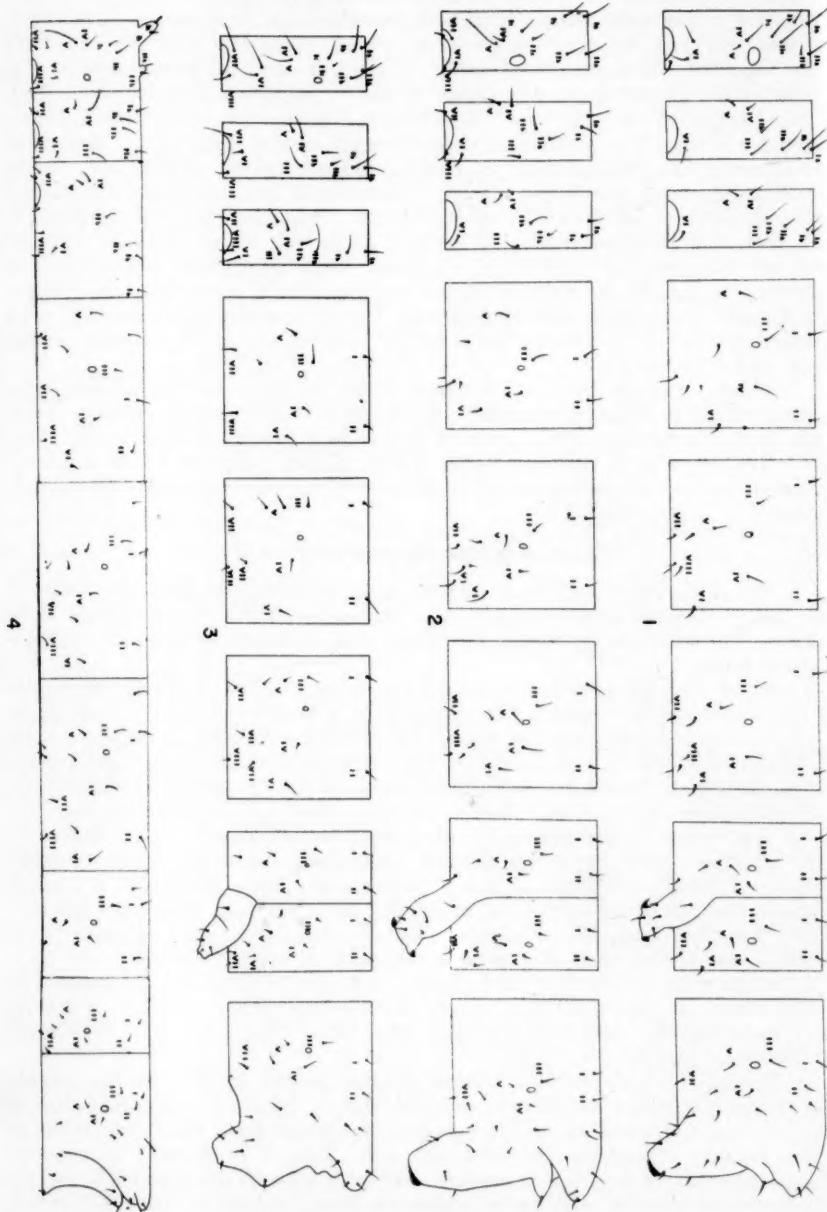
Goodell (1880) and Hulst (1880) have described the larva and pupa of this species briefly, and Comstock and Dammers (1934) have figured these stages. The description below, therefore, deals primarily with the arrangement of setae.

C. chloroleucaria is double brooded in southern New England, the second brood appearing in August. The pupal stage requires ten days. The larvae studied here fed on the leaves of *Apocynum androsaemifolium* L. and the flowers of species of *Zinnia*. The following have also been recorded as food plants: *Eupatorium perfoliatum* L., *Achillea millefolium* L., *Helenium autumnale* L., *Leucanthemum vulgare* Lam., *Helianthus* spp., *Aster* spp., and red raspberry.

Last instar. Head height 1.2 mm.; head width .93 mm. Tall and somewhat triangular with the vertex peaked. Indentation in vertex deep. Surface irregularly rugose. Light green with a suffusion of ruby at the tips of the spines and in a line from the vertex to the ocelli. Setae of head short and colorless (plate XV, figs. 2 and 3). Posterior setae (P_1 and P_2), second adfrontal setae (ADF_2), and lateral setae (L_1) grouped near top of head. Ultra-posterior setae (X) on posterior side of spine-like vertex. Anterior setae (A_1 , A_2 , A_3) form an obtuse angle. Ocellar setae (O_1 , O_2 , O_3) form a right angle. Frontal punctures (F_a) close together and below frontal setae (F_1). Six ocelli well developed, ocellus three largest.

Length of body 18 mm. General color powder green. Surface evenly covered with conspicuous sharply rounded warts. Powdery appearance due to the fact that the warts are white. Dorsal line green with faint indication of yellow borders. Sometimes suffused with red. Tips of prothoracic spines, tips of legs, substigmatal line on last segment, and spiracles ruby red (plate XV, fig. 1). Young larvae usually with more extensive areas of red in spots indicated. Crochets few in number. Biordinal, arranged in a half circle interrupted by a flap. Prothoracic setae I_a , I_b , II_a , and II_b located on large spines. Anterior spines largest. Metathoracic setae I_a , I_b , II_a , and II_b widely separated. Setae I and II of abdominal segments located on posterior two-thirds of the segments.

PLATE XVII.



LIFE HISTORIES OF GEOMETRIDAE

Seta II more laterad than I. Seta III above and slightly anterior to spiracle on all but first abdominal segment. Seta IV lower and behind. On first to fifth abdominal segments seta V is directly below III. Seta VI near posterior margin of segment. Setae short and colorless.

Pupa. Length 10 mm. Greatest width 2.5 mm. Surface smooth. Sockets of few scattered colorless hairs fuscous. General color light green to light brown.

Nemoria rubrifrontaria Pack.

The very interesting larva of this species was described in a few words by Packard (1876). Its bizarre shape warrants a more detailed consideration. Larvae feed on *Comptonia asplenifolia* Ait., the leaves of which they closely resemble both in shape and coloring.

Last instar. Head height 1.6 mm.; head width 1.4 mm. Head tapering slightly toward vertex. Covered with coarse rugosities. Sienna to yellow brown. Setae short and colorless. Arranged as shown in plate XV, figs. 4 and 5. Second posterior setae (P_2) near tip. Second adfrontal setae (ADF_2) slightly below P_1 . First adfrontal setae nearer to ADF_2 than to frontai setae (F_1). Anterior setae in straight line (A_1, A_2, A_3). Six ocelli well developed. Fifth remote from rest. First ocellar seta (O_1) nearly in middle of triangle formed by ocelli 3, 4, and 6.

Length of body 15 to 20 mm. Body slightly compressed dorsoventrally. With prominent lateral projections on each segment. Those of first four abdominal segments largest (Plate XVI). Generally sienna in color. Frequently suffused with orange, yellow or green. May also be greenish, russet, yellow green, greenish brown, etc. Ventral side and intersegmental membranes usually yellowish or greenish. Lateral extensions more or less reddish brown. Spiracles concolorous with body. Rimmed with dark brown. Rough continuous substigmatal line whitish due to the presence of blunt white spines. Base of spines from which hairs arise may or may not be brilliant red. Surface of body rough, composed of many blunt spine-like projections. Only the largest are indicated in plate XVI. Crochets biordinal in a half circle interrupted by a flap. Prothoracic setae $I_a, II_a, I_b, II_b, I_c$ and II_c arise from prominent roughened reddish tubercles as indicated. Setae IV and V from less conspicuous tubercles in front of the spiracles. Setae VI bisetose. Mesothoracic setae I_a and I_b arise from dorsal tubercles. Setae II_a, II_b, III, IV , and V arise from lateral projections. Seta VI unisetose. Metathoracic setae similarly arranged. Seta II of first and fifth abdominal segments more laterad than seta I. Both are at same level on abdominal segments two to four. On abdominal segments six and seven setae I and II are both more laterad than on preceding segments. Seta I on eighth abdominal segment mounted on a very prominent spine directed posteriorly. All others directed anteriorly. Spiracles on second, third, fourth, fifth, seventh, and eighth abdominal segments are on dorsal surface. Those on remaining segments on the lateral surface. In the former cases seta III is anterior to the spiracle; in the latter, above it. Setae IV and V are at the extreme ends of the wide lateral projections. Seta VI arises from a spine of its own at the extreme posterior edge of the segment. Setae VII and VIII are in the usual positions.

LITERATURE CITED

Comstock, J. A. and Dammers, C. M. 1934. Additional notes on the early stages of California Lepidoptera. *Bul. S. Calif. Acad. Sci.* 33 (1):29-30.
 Goodell, L. W. 1880. On the early stages of four geometrid moths. *Can. Ent.* 12 (11):235-236.
 Hulst, G. D. 1880. Notes on *Nemoria chloroleucaria* Guen. *Bul. Brooklyn Ent. Soc.* 2 (10,11):78.
 Packard, A. S. 1876. Monograph of the geometrid moths. 363, 371, 387.
 1890. Fifth annual report to the U. S. Entomological Commission. 501-502.

EXPLANATION OF PLATES

PLATE XIV.

Fig. 1. Front view of the head of the mature larva of *Cosymbia pendulinaria* Gn.
 Fig. 2. Lateral view of same.
 Fig. 3. Front view of the head of the mature larva of *Nepytia canosaria* Wlk.
 Fig. 4. Lateral view of same.
 Fig. 5. Mature larva of *Cosymbia pendulinaria* Gn.
 Fig. 6. Dorsal view of the pupa of *Nepytia canosaria* Wlk.
 Fig. 7. Lateral view of the pupa of *C. pendulinaria* Gn.
 Fig. 8. Ventral view of the pupa of *N. canosaria* Wlk.

PLATE XV.

Fig. 1. Mature larva of *Chlorochlamys chloroleucaria* Gn.
 Fig. 2. Lateral view of the head of the mature larva of same.
 Fig. 3. Front view of same.
 Fig. 4. Lateral view of the head of the mature larva of *Nemoria rubrifrontaria* Pack.
 Fig. 5. Front view of same.
 Fig. 6. Ventral view of the pupa of *Elloia fiscellaria* Gn.
 Fig. 7. Dorsal view of same.
 Fig. 8. Front view of the head of the mature larva of same.
 Fig. 9. Typical abdominal segment of *N. canosaria* Wlk. to show color pattern.
 Fig. 10. Lateral view of the head of the mature larva of *E. fiscellaria* Gn.

PLATE XVI.

Dorsal and lateral views of the fully grown larva of *N. rubrifrontaria* Pack. showing the arrangement of the setae.

PLATE XVII.

Fig. 1. Map of the body setae of the mature larva of *N. canosaria* Wlk.
 Fig. 2. Same for *E. fiscellaria* Gn.
 Fig. 3. Same for *C. pendulinaria* Gn.
 Fig. 4. Same for *C. chloroleucaria* Gn.

In each case the three thoracic and the first, second, third, sixth, seventh, and eighth abdominal segments are shown.

A NEW CANADIAN SPECIES OF *ASPHRAGIS* (HYMENOPTERA,
 ICHNEUMONIDAE)*

BY G. STUART WALLEY,

Ottawa, Ont.

In 1925 Cushman (Jl. Wash. Acad. Sci., XV, 392) transferred *Meniscus mirabilis* Cress. to the genus *Asphragis*, and synonymized with it *Asphragis pulcherrimus* Ashm., *Clistopyga pleuralis* Ashm. and *Meniscus ostentator* Davis. Up to the present this species has constituted the only representative of the genus reported from the United States and Canada.

The National Collection contains a series of *mirabilis* from various Canadian localities, ranging from the Maritime provinces to British Columbia. This series exhibits the usual variations in color characteristic of the species.

A second species is represented in our collections by three specimens taken at Canim Lake, B. C., by the late J. Kenneth Jacob. I take pleasure in naming this species in honor of Mr. Jacob, whose collections of British Columbia insects have proved such a valuable addition to the National Collection.

Asphragis jacobi n. sp.

This species agrees with *Asphragis mirabilis* (Cress.) in the entire absence of an areolet and the general shining appearance of the body, especially the head and dorsum of the thorax. It differs markedly from *mirabilis* in its much smaller size, much shorter and broader radial cell, and the differently maculate body and legs, also in details of sculpture of the propodeum and abdomen.

*Contribution No. 2197, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

Female. Length 4.5 mm., antennae 4 mm., ovipositor sheath 3.5 mm. Head transverse, a little wider than thorax; temples rounded and strongly receding; face twice as wide as length at middle from base of clypeus to antennal foramen; clypeus strongly convex, rather sharply dissected; malar space slightly less than basal width of mandible; cheeks convex; ocelli small; postocellar line almost twice diameter of an ocellus and equal to ocell-ocular line; antenna 28-segmented, scape only moderately excised; head shining, with only a few microscopic punctures on face and clypeus; cheeks, malar space, frons, and vertex in the region of and including the ocellar triangle, with fine alutaceous sculpture, remainder of vertex and temples polished.

Thorax shining; pronotum mostly smooth, with a few fine scattered punctures; mesoscutum impunctate, shining, wholly smooth except for faint reticulate shagreening on anterior portion; scutellum polished; mesopleura polished, finely sparsely punctate; metapleura a little more densely punctate; propodeum shining, with a well defined apical transverse carina and a slight indication of a pair of median longitudinal carinae, the latter interrupted and confused by the general sculpture of the area, which consists of very fine irregular and often obsolescent transverse rugulae and a few obscure punctures; pleural carina distinct and complete; spiracle small, circular.

Radial cell short, three-fourths as broad as distance from tip of stigma to apex of radial cell measured along metacarpus; first and second abscissae of radius forming an angle of about 100 degrees; nervulus slightly postfurcal; subdiscoideus below middle of first brachial cell; nervellus perpendicular, broken far below middle.

Legs long, slender, tarsal claws with 3 or 4 distinct teeth.

Abdomen a little longer than head and thorax combined, moderately shining, first three tergites and base of fourth tergite with distinct sculpture; first tergite narrowly sessile at base, almost two-thirds as broad at apex as long, convex, with a pair of short carinae extending a little beyond spiracles, surface finely roughened and with numerous fine somewhat irregular longitudinal rugulae; second tergite slightly broader at apex than long, with a shallow transverse subapical impression, sculpture as in first tergite but a little finer and absent on narrow apical margin; third tergite finely granular-rugulose, smooth at apex; fourth tergite only feebly sculptured at base, with a broad smooth apical margin.

Body black, paler as follows: spot on scape and pedicel below, face (except for 3 fused spots, one median and one on either side, forming a trilobed transverse bar immediately below antennae) clypeus, mandibles except teeth, malar space, gena, anterior orbit expanding into a broad spot at summit of eye, angulate spot on centre of mesoscutum, scutellum, tegula, a minute spot before and another below tegula, broad longitudinal stripe on mesopleura below, front and middle coxae entirely and all except inner surface of hind coxa, yellow; palpi, propleura and adjacent portion of pronotal collar, yellowish with fuscous staining; legs reddish, the front and middle trochanters and apical segment of hind trochanter somewhat paler in front, hind tibia with a broad suffused fuscous band narrowly separated from base, and another at apex; hind tarsus dark brown, the front and middle tarsi paler brownish; stigma and veins brown, extreme base of wing yellow; narrow apical margin of second abdominal tergite brownish, the polished apices of the following tergites very narrowly and obscurely paler.

Male. Length 4 mm. General structure and appearance as in female; first three tergites of abdomen with fine reticulate alutaceous sculpture. Color as in female but paler markings more extensive, the face entirely yellow, the mesoscutal spot larger and joined by narrow lines indicating position of notaulices to the anterior end of a broad marginal stripe on mesoscutum before tegula; mesopleural stripe very broad and continuous with the broadly yellow

pronotal collar; metapleuron with a yellowish spot; second tergite yellow on the narrowly impressed basal portion, also narrowly yellow at apex, as is also the third tergite, the latter also with a distinct narrow yellow basal band; lateral margins of the posterior tergites and genital claspers brownish.

Holotype—♀, Canim Lake, B. C., June 22, 1938, (J. K. Jacob); No. 5361 in the Canadian National Collection, Ottawa, Ont.

Allotype—♂, same data as holotype.

Paratype—♀, same data as holotype. Deposited in the United States National Museum.

Notes—The paratype differs from the above description of the holotype in its slightly larger size (length 5 mm.), 29-segmented antenna, and in having the abdominal tergites with somewhat different sculpture, the first and second tergites with fewer and more irregular rugulae, the second tergite largely finely granular-reticulate at base and the third almost entirely so. In the paratype the mesoscutal spot is divided into two triangles, and there is a narrow yellow marginal stripe on the mesoscutum before the tegula.

NOTE

A SIMPLE METHOD FOR USE IN STAINING LIVING APHIDS

One of the difficulties encountered in most attempts at staining living aphids has been injury to the insect in trying to remove it from the host plant or by application of the staining material. In connection with the indoor rearing of the aphid *Myzus persicae* Sulzer in winter on potted turnip plants kept on the laboratory table, it was found possible to overcome both of these difficulties and to stain aphids at the rate of 300 per hour with very simple apparatus.

The winged aphids developed in crowded colonies on the turnip sprouts were found to be positively phototropic and to fly at once to the nearest window where they gathered in large numbers. When gently stirred with a camel's hair brush, they formed clusters in much the same way as swarming bees and such clusters, a centimeter in diameter, could easily be moved to a staining apparatus.

The staining apparatus was made up of very simple materials, a glass tube 10 inches long and one inch in diameter with a test tube brush to fit neatly inside. The bristles of the brush were thoroughly coated with a finely powdered dry stain by rolling it in a dish of the stain before inserting it in the tube. The brush was adjusted in the centre of the tube and cotton plugs provided for each end of the tube. In use the winged aphids in lots of approximately 300 were placed in one end of the tube which was then covered with a strip of wrapping paper loosely rolled about the tube and held in place with a rubber band. This was to exclude light. The uncovered end of the tube was directed towards a window, and the aphids, in crawling through the stain-bearing bristles of the brush, coated themselves very thoroughly on body, legs, wings and antennae.

A variety of dry stains were tried. Synthetic ultramarine was found a satisfactory blue, powdered carmine a good bright red, iron oxide a dark red. The metallic aluminium powder and bronze powder gave interesting colors but had an injurious effect on the insect when exposed to strong sunlight.

Several shipments of the stained aphids were sent to distant points: Ottawa, Brandon, Manitoba, and Agassiz, B. C., and on return were still healthy and able to reproduce. On plants out-of-doors, the colored aphids could be detected after two weeks exposure.

R. P. Gorham,

Fredericton, N. B.

GUELPH PRINTING SERVICE

Mailed Wednesday, January 20, 1943.

Index to Volume LXXIV

Aeolothrips melaleucus Hal., 42
Agabus aequalis Sharp, 194
 ancillus Fall, 136
 brevicollis Lec., 128
 clypealis Thom., 194
 confertus Lec., 129
 dispositus Guig., 194
 fossiger Mots., 136
 griseipennis Lec., 131
 hoppingi n. sp., 135
 irregularis Mann., 130
lutosus *lutosus* Lec., 131
 lutosus mimus n. subsp., 132
morus Lec., 133
 nectris n. sp., 133
New or Insufficiently Known
Nearctic Species and Subspecies of,
125
obliteratus Lec., 133
obsoletus Lec., 135
 pandurus n. sp., 128
parallelus Lec., 126
seriatus intersectus Crotch,
n. comb., 126
seriatus seriatus Say, 126
striatus Aube, 126
 versimilis Br., 129
 vandykei n. sp., 129
ALEXANDER, CHARLES P., Article by, 206
Allotropa utilis Mues., 118
Ancistrocerus catskillensis Sauss., 13
Aneliptus americanus Horn, 188
 canadensis n. sp., 190
 Horn, A Review of the Genus,
186
Anisota rubricunda sperryae n. form, 116
Anomogyna elimita Gn., 21
 perquirrita Mort., 23
Anoncia diveni Heinr., 17
 episcia Wlshm., 18
 leucoritis Meyr., 19
 longa Meyr., 17
 marinensis Keif., 18
 mentzeliae n. sp., 18
 orites Wlshm., 18
 sphacelina Keif., 18
 with one New Species, A Synopsis
 of the Genus, 17
Anopheles punctipennis Say, 20
 quadrimaculatus Say, 20
 walkeri Theob., 20
Ant Nesting Habits in North Dakota in
1941 Compared with Drouth Years, 61
Aphania capreana Hbn., 70
Aphis abbreviata Patch, 96
Apple Mealybug, *Phenacoccus aceris*
Signoret, and its Allies in North-
eastern America, The Canadian, 118
Arenophilus biquincticeps Wood, 15
Argyrotaenia from Spruce, A New, 57
 lutosana Clem., 57
 occultana n. sp., 57, 60
Asphragis, A New Canadian Species of, 234
 jacobi n. sp., 234
 mirabilis Cress., 234
 pulcherrimus ashin., 234

Asyndetus utahensis n. sp., 85
Athripsodes alces Ross, 49
 annulicornis Steph., 49
 arielles n. sp., 48
Autographa rectangula, 56
 selecta Wlk., 54

Baetis bicaudatus Dodds, 30
 intermedius Dodds 30
 vagans McD., 30
Bait for Grasshopper Control, A Dry, 77
BEAMER, R. H., Article by, 14
BEARD, RAIMON L., Article by, 86
BEAULNE, JOS. I., Article by, 12
Beetle from Oregon, A New Cerambycid, 51
Bembecia marginata Hair., 19
BEQUAERT, J., Article by, 159

BOOK NOTICE:

Atlas of the Scale Insects of North
America, Series IV by G. F. Ferris, 215
Borkhausenia leucoritis Meyr., 17
 longa Meyr., 17

BOWMAN, KENNETH, Article by, 25
BROOKS, A. R., Article by, 140
BROOKS, G. SHIRLEY, Article by, 31
BROWN, A. W. A., Articles by, 8, 21, 52, 58
BROWN, W. J., Articles by, 99, 172
BURDICK, W. N., Articles by, 2, 154, 195, 204
Butterflies of Manitoba, A Revised Check
List of the, 31

Cannula pellucida Scud., 77
Camponotus herculeanus pennsylvanicus
DeG., 62
Cerceris clypeata Dahl., 14
Chalybion caeruleum L., 196, 217
 californicum Sauss., 218
 zimmermanni Dahlb., 196, 218
CHAMBERLAIN, RALPH V., Articles by, 15, 91
Charadra deridens nigrosuffusana Strnd., 95
 deridens Wlk., 95
 (*Panthea*) *palata* Grt., 95
Cheumatopsyche burksi Ross, 50
 campyla Ross, 50
 ela n. sp., 50
 mickeli n. sp., 50
Chironetes albomanicatus Needh., 29
Chlorochlamys chloroleucaria Gn., 231
Cicadidae of Alberta, Notes on the, 155
CLARKE, J. F. GATES, Article by, 17
Clistomorpha didyma Lw., 142
 Palidopteryx and Allies, 140
Clistopyga pleuralis Ashm., 234
Coast Tick (*Ixodes californicus* Banks)
 Problem in British Columbia,
The, 3
Coenonympha amplus from the Mono
Basin of California, A New
Race of, 2
 ampelos mono n. race, 2
 inornata Edw., 2, 31

Coleophora alticolella Zell., 171
ciliaeochrella Cham., 168
fagicorticella Cham., 171
glaucicolella Wood, 168
glissandella n. sp., 170
kearfottella B. & Bsk., 167
maritella McD., 168
unicorella Cham., 171
viburniella Clem., 167

Coleophoridae. Further Notes on Maritime, 167

Colias christina mayi Cherm., 31
eurytheme alberta n. subsp., 25
eurytheme amphidusa, 25
eurytheme ariadne, 25
eurytheme Bdv., with Description of a New Race, A note on, 25

Colocasia flavidornis Sm., 93
infanta Sm., 93
propinquilinea Grt., 93

Common Blue Mud-Dauber, The Scientific Name of the, 217

Cosymbia pendulinaria Gn., 225
pendulinaria nigricaria Rothke., 227

Cottony peach scale, 40

Crabro (*Hoplocrabro*) *boulderensis* Roh., 184
(*Hoplocrabro*) *spinibuccus* Vier., 185

Crane-Flies, Part XVII, New Nearctic, 206

Crossocerus (*Hoplocrabro*) *angelicus* Kinc., 181
(*Hoplocrabro*) *4-maculatus* F., 179

Culex tarsalis, 76

Dactylolabis adventitia n. sp., 211
hortensis sparsimacula n. subsp., 212
supernumeraria Alex., 212

Demas flavidornis, 93

Dendrotonus pseudotsugae Hopk., 205

Dendrotettix quercus Pack., 97

DENNING, DONALD G., Article by, 46

DETHIER, V. G., Articles by, 6, 225

Diprion simile Htg., 165

Dolichopodidae from Utah and Colorado, New, 80

Doratopsylla curvata curvata Roths., 157
curvata obtusata Wagn., 157

Dorymyrmex pyramicus niger Perg., 62

Douglas fir bark beetle, 205

Dragonflies Collected by Mrs. Alice L. Dietrich in Mississippi, Two New Species of, 71

Elachista maritimella n. sp., 224
subalbidella Schlag., 224

Elllopia fiscellaria Gn., 229

Elm Bark Infesting Coleoptera. Larval Characteristics of Certain, 86

Endothenia affiliana n. sp., 63
melanosticta Wlshm., 63

Entomoscelis adonidis Pall., 172
americana n. sp., 172
and *Hippuriphila*, The American Species of, 172

Eomystra dulkejti Mart., 46
unica n. sp., 46

Ephemerella doddii Needh., 27
inermis Eat., 30
yosemitae Trav., 27

Ephestia kuhniella Zell., 38

Epiblema abbreviatana Wlshm., 68

Epinotia signifera Heinr., 69

Epitedia scapani Wag., 157

Eucosma acana n. sp., 68
betana n. sp., 68
immaculana Kft., 69
invicta Wlshm., 69
jejunana n. sp., 67
sperryana n. sp., 69
suadana Kft., 68

Eumenes globulosa Sauss., 14

Eumenis dionysus Scud., 204
ridingsii Edw., 204
stretchii Edw., The Rediscovery of, 204

Eupithecia areuthata Fr., 203
chagnoni Swett., 203
filimata Pears., 202
gibsonata Tayl., 152, 203
palpata Pack., 150
Species, Notes on the Early Stages of Two, 202

European Red Mite, 37
Spruce Sawfly, 164, 193, 197

Eurymerodesmus boonei n. sp., 16
melacis, 16

Evora hemidesma Zell., 70

Exartema baccatum n. sp., 65
betulanum Kft., 64
fraternum McD., 63
furfuratum McD., 63
melanomesum Heinr., 64
permundatum, 65
rusticanum McD., 64
tilianum Heinr., 63
trepidulum Heinr., 64
viburnatum McD., 64
zellerianum Fern., 64

FISHER, W. S., Article by, 51
Fleas from Western North America, 157
Synonymy of Some, 157

Forest tent caterpillar, 165

Frass in the Identification of Forest Insect Damage, The Use of, 164

FREEMAN, T. N., Articles by, 57, 212

Geometridae. Notes on the Life Histories of Five Common, 225

Gilpinia hercyniae Htg., 164, 193, 197

Gomphus plagiatus Selys, 72
(*Gomphurus*) *modestus* n. sp., 72
(*Stylurus*) *potulentus* n. sp., 71

Grapholitha boulderana n. sp., 69
caeruleana Wlshm., 70
molesta Busck., 37, 219

Graptolitha from British Columbia with Notes, An Apparently Undescribed, 161
laceyi B. & McD., 163
laticinerea Grt., 163
pertorrida n. sp., 163
puella Sm., 163
torrida Sm., 161

GREGSON, J. D., Articles by, 3, 137

Haplothrips subtilissimus Hal., 37

HARDY, D. ELMO, Article by, 105

HARMSTON, F. C., Article by, 80

Herculia intermedia Wlk., The Larva and

Pupa of, 6

thymetusalis Wlk., 58

HICKS, S. D., Article by, 78

Hippuriphila canadensis n. sp., 176

equiseti B. & H., 174

mancula Lec., 175

modeeri L., 175

HOLLAND, GEORGE P., Article by, 157

Holocremnus lophyri Riley, 193

ratzeburgei Tschek., 193

Hoplocrabro, A Subgenus of Crossocerus, On, 177

Host Plants and Parasites of Some Lepidopterous Larvae, 219

Hyalomyodes californica TT., 141

robusta TT., 141

triangulifera Lw., 141

Hydriomena divisaria Wlk., 153

Hydropsyche alhedra Ross, 49

riola n. sp., 49

slossonae Bks., 49

Hylurgopinus rufipes Eichh., 87

Hypenomyia petiolata Wlk., 89

rubidiapex n. sp., 89

subnitens n. sp., 91

Hyperaspis signata Oliv., 123

Iron longimanus Eat., 30

Ixodes angustus Neum., 139

californicus Banks, 3

ricinus Linn., 4

sorcius n. sp., 137

Japanese beetle, 197

Comstock mealybug., 118

KNOWLTON, G. F., Article by, 80

Larch sawfly, 197

Larvae of Forest Insects, Introduction; I.

Panthea, New Descriptions of, 8

of Forest Insects; II. Anomogyna,

New Descriptions of, 21

of Forest Insects; III. Zanclognatha,

Palthis, and Autographa, New

Descriptions of, 52

of Forest Insects; IV. Herculia,

Tortrix and Argyrotaenia, New

Descriptions of, 58

of Forest Insects; V. Eupithecia,

Hydriomena, New Descriptions of,

180

LEECH, HUGH B., Article by, 125

Lepidosaphes ulmi Linn., 122

Leptophlebia adoptiva McD., 29

Leptothrips mali Fitch, 42

Leucorrhinia hudsonica Selys, 75

patricia Walker, with Further Notes on the Male, The Female of, 74

Limnephilus acrocurvus n. sp., 48

LINDUSKA, J. P., Article by, 26

Lissonota punctulata Cress., 13

Macrocentrus amicroploides Vier., 12

Magdalais armicollis Say, 86

barbita Say, 86

Malacosoma disstria Hbn., 165

Manica mutica Emery, 62

MANK, EDITH W., Article by, 186

Mayfly Nymphs, Bottom Type as a Factor Influencing the Local Distribution of, 26

McDUNNOUGH, J., Articles by, 1, 63, 93, 117, 161, 167, 202, 224

McGUFFIN, W. C., Articles by, 8, 21, 52, 58,

150

Mediterranean flour moth, 38

Megabothris abantis Roth., 158

adversus Wagn., 158

Megachile latimanus Say, 14

Melanoplus mexicanus Saus., 77

Meniscus mirabilis Cress., 234

ostentator Davis, 234

Mesamia, Four New Species of, 44

infuscata n. sp., 45

nervosus Osb., 44

obtusa n. sp., 44

prescotia Ball, 44

retusa n. sp., 45

vermiculata n. sp., 44

Microchaetina cinerea v.d. Wulp., 88

setifacies n. sp., 88

Microlepidoptera, Two Undescribed

Canadian, 224

Microplectron fuscipennis Zett., 201

Millipedes of the Genus Rhysodesmus from

Mexico, Two, 91

Monomorium minimum Buck., 62

MORRIS, R. F., Articles by, 164, 197

Mycetaea hirta Marsh., 12

Myriopods from Iowa, On a Collection of, 15

Myrmica brevinodis brevispinosa Wheel., 62

fracticornis, 62

Myzus persicae Sulz., 36, 76, 236

Nadabius iowensis Mein., 15

Natural Control of the European Spruce

Sawfly by small Mammals, Preliminary

Notes on the, 197

Nearctopsylla jordani Hubb., 158

NEEDHAM, JAMES G., Article by, 71

Nemoria rubrifrontaria Pack., 233

Neopsalidopteryx alberta Cn., 143

deceptor Cn., 144

n. gen., 142

Neptyia canosaria Wlk., 227

Neurigona albospinosa V. D., 80

ciliata V. D., 82

dimidiatus Lw., 82

uinta n. sp., 80

zionensis n. sp., 81

NOTES:

The American Commission on Scientific

Nomenclature in Entomology, 216

Anisota rubincunda Fabr. form sperryae

form nov., 116

Apparent Negative Geotropism in the

Douglas Fir Bark Beetle, 205
 A Collection of Anopheline Mosquitoes from Southern Ontario, 20
 Dr. F. Guignot's Synonymy of *Agabus* *dispositus* Guignot, 194
 Human Sleeping Sickness Traces to Common Mosquito Bite, 75
 Mandibular Shapes in Water Beetles of the Genus *Thermonectus*, 56
 The Raspberry Root-borer in Saskatchewan, 19
 Rearing the Aphid, *Myzus persicae* Suzer, Indoors in Winter, 76
 Retirement of Dr. Arthur Gibson, 36
Rhamnus alnifolia L'Her., A Winter Host of *Aphis abbreviata* Patch, One of the Aphids feeding upon Potato Foliage, 96
 A Simple Method for Use in Staining Living Aphids, 236
 The Sleep of *Chalybion zimmermanni* Dahlb., 196
 The Sting of *Polistes pallipes* Lep., 95
 Varietal Susceptibility of Potatoes to Aphid Injury, 36

Notes from 1940, 12

Oecanthus nigricornis, 97
pini Beut., 97
Oeneis chryxus calais Scud., 32
macouni Edw., 31
Okanagana bella Davis, 155
canadensis Prov., 155
fratercula Davis, 156
luteobasalis Davis, 156
rimosa Say, 156
synodica Say, 156
Olesicampe Parasite of *Pikonema* Sawflies, A New, 193
pikonemae n. sp., 193
 Oriental Fruit Moth, 37, 219

Palthis angulalis Hbn., 52
Panthea acronyctoides Wlk., 8, 93
furcilla atrescens n. form., 94
furcilla centralis n. var., 94
furcilla Pack., 10, 94
gigantea Frch., 93
portlandia Grt., 93
virginaria Grt., 93
 Pantheinae, Notes on, 93
Papilio nitra Edw., 31
 Parasites of Some Lepidopterous Larvae, Host Plants and, 219
Paratetranichus pilosus C. & F., 37
 PATE V. S. L., Articles by, 177, 217
 PAUL, L. C., Article by, 77
Pedicia (*Tricyphona*) *formosana* Alex., 211
 (*Tricyphona*) *townesiana* n. sp., 210
 (*Tricyphona*) *yakushimana* Alex., 211
Pelopeus californicus Saus., 218
Peronea bowmanana McD., 70
braunana McD., 70
gallicolana Clem., 70
inana Rob., 70
walkerana McD., 70

Phenacoccus acericola King, 123
aceris Sign., 118
colemani Ehr., 123
dearnessi King, 124
gossypii TT. & Ckll., 124
pergandeae Ckll., 121
saratogensis Rau, 124
serratus Ferris, 124
stachyos Ehr., 124

Philotes glaucon Edw., 195

Phyllocoptes cornutus Banks, 40

Phymatodes funebris V. D., 51
malkini n. sp., 51

Phytodecta affinis Gyll., 100
americana Schffr., 103
arctica Mann., 100
Kby., The American Species of, 99
nivosa Suffr., 100
notmani Schffr., 103
occidentalis n. sp., 104
scutellaris Sahlb., 102

Pieris napi L. from New Mexico, A New Race of, 154
napi mogollon n. race, 154
napi venosa Scud., 154

Pikonema alaskensis Roh., 194
dimmockii Cress., 194
 Sawflies, A New Olesicampe Parasite of, 193

Plebeius lupini Bdv. from the Olympic Mountains of Washington, A New Race of, 195
lupini spangeleratus n. race, 195
shasta Behr., 195

Plecia bicolor Bell, 108
collaris Fab., 106
confusa Lw., 112
ecuadorensis *micana* n. var., 108
 (*Plecia*) *curvistyla* n. sp., 107
 (*Plecia*) *incurvata* n. sp., 110
 (*Plecia*) *parvistyla* n. sp., 112
 (*Plecia*) *pertinens* n. sp., 112
 (*Rhinoplectia*) *biarmata* n. sp., 105
 (*Rhinoplectia*) *biformis* n. sp., 106
 (*Rhinoplectia*) *braziliana* n. sp., 106
 (*Rhinoplectia*) *dentata* n. sp., 107
 (*Rhinoplectia*) *disparis* n. sp., 108
 (*Rhinoplectia*) *ecuadorensis* n. sp., 108
 (*Rhinoplectia*) *gibbosa* n. sp., 109
 (*Rhinoplectia*) *maculata* n. sp., 110
 (*Rhinoplectia*) *panamaensis* n. sp., 111
 (*Rhinoplectia*) *perplexa* n. sp., 112
 (*Rhinoplectia*) *rectiora* n. sp., 113
 (*Rhinoplectia*) *serrata* n. sp., 114
 (*Rhinoplectia*) *trilobata* n. sp., 114
 (*Rhinoplectia*) *uberta* n. sp., 115
 (*Rhinoplectia*) *varabilis* n. sp., 115
 (*Rhinoplectia*) *xenia* n. sp., 109
rostellata Lw., 109
rufithorax concava n. subsp., 114
rufithorax Wlk., 106
 Studies in New World, 105
vittata Wied., 114

Pogonomyrmex occidentalis Cress., 62

Polistes fuscatus aurifer Sauss., 160
 fuscatus connectens Beq., 160
 fuscatus from Canada, A New Color Form of, 159
fuscatus laurentianus n. var., 159
 fuscatus montanus Beq., 160
 fuscatus pallipes Lep., 160
 fuscatus variatus Cress., 160
 pallipes Lep., 95

Polydesmus planicoleus n. sp., 16
scopus n. sp., 16
 serratus, 16

Popillia japonica Newm., 197

Prionocera rostellata churchilliana n. subsp., 206
rostellata prominens n. subsp., 206

Pristiphora erichsoni Htg., 197

Psalidopteryx alaskensis n. sp., 148
brunnescens n. sp., 147
dorsalis Coq., 148
fuscisquamis n. sp., 149
grandis n. sp., 149
macdunnoughi n. sp., 146
nuda n. sp., 147
orientalis n. sp., 146
pollinosa n. sp., 148
pseudonuda n. sp., 147
psilocorsiphaga n. sp., 149
slossonae TT., 145

Pseudexentera from Apple, with Notes on Allied Species, A New Species of, 212
improbana Wlk., 213
mali n. sp., 213
oregonana Wlk., 213

Pseudococcus comstocki Kuw., 118

Pseudopanthea n. gen., 94
palata utahensis n. var., 95

Pulvinaria amygdali Ckll., 40

PUTMAN, W. L., Articles by, 37, 219

RAU, GEORGE J., Article by, 118

REINHARD, H. J., Article by, 88

Rhaphium colutis n. sp., 83
discolor Zett., 84
obtusum V. D., 85

Rhithrogena doddsi McD., 30
virilis McD., 30

Rhysodesmus cuernavaca n. sp., 92
eusculptus, 92
notostictus Poc., 92
potosianus n. sp., 91

Saltatoria in Ontario, New Records and Notes of, 97

Sandalus niger Knoch in Southern Ontario, Observations on the Adult of, 78

Scellus amplus Cn., 83
coloradensis n. sp., 82
filiferus Lw., 83
vigil O. S., 83

Schistocerca alutacea Harr., 98
americana Dru., 98

Scolothrips sexmaculatus Perg., 42

Scolytus multistriatus Marsh., 87
rugulosus Ratz., 87
scolytus Fab., 87
sulcatus Lec., 87

Scotodes annulatus Esch., 186

Scudderia fasciata Beut., 97
fureata, 97

Scythris epilobiella n. sp., 224

Silver leaf mite, 40

Solenius sayi Ckll., 14

Solenopsis molesta Say, 62

Sphecodes cyanea Fab., 217

Spirostrephon jonesi n. sp., 17
lactarium, 17
texense, 17

Stethorus punctum Lec., 42

Strymon, A New Canadian, 1
calanus Hbn., 1
caryaevorus n. sp., 1
edwardsii, 1
falacer Godt., 1
heathi Fletch., 31
strigosa, 1

Tachinidae Belonging to the Genera Microchaetina and Hypenomyia with Key to the Known Species, New North American, 88

Tapinoma sessile Sten., 62

Tetranychus telarius L., 40

Thermonectus basilaris Harr., 56
ornaticollis Aube, 56

Thiodia autumnana n. sp., 66
citricolorana n. sp., 66
decempunctana Wlshm., 67
refusana Wlk., 66
rupestrana McD., 67
tarandana Moesch., 68
vernana n. sp., 67

Thraulodes arizonicus n. sp. 117 from Arizona, An Apparently New, 117
speciosus Trav., 117

Thrips Halothrips subtilissimus Hal. and Aeolothrips melaleucus Hal., Notes on the Predaceous, 37

Tibicen linnei Sm. & Gross., 79

Tick found on Shrews, A New Species of, 137

TINKHAM, E. R., Article by, 155

Tipula (*Lunatipula*) *disjuncta* Wlk., 209
 (*Lunatipula*) *polycantha* n. sp., 209
 (*Lunatipula*) *sperryana* n. sp., 208
 (*Lunatipula*) *vittatipennis* Doane, 210
 (*Oreomyza*) *neptun* Dietz, 209
 (*Trichotipula*) *apache* Alex., 208
 (*Trichotipula*) *cazieri* n. sp., 207

Tortricid Notes and Descriptions, 63

Tortrix packardiana Fern., 58

Trichoptera from the United States, Descriptions of New, 46

URQUHART, F. A., Article by, 97

Vespa rufa *acadica*, 160
rufa *vidua*, 160

WALKER, E. M., Article by, 74

WALLACE, PHILIP P., Article by, 86

WALLEY, G. STUART, Articles by, 193, 234

WEBER, NEAL A., Article by, 61

Zanclognatha mineralis Sm., 52
Zerene caesonia Stoll., 31
Zinaria cala, 17

Zinaria iowa n. sp., 16
urbana, 17

CORRECTIONS,

(volume LXXIV)

BROOKS G. SHIRLEY. A revised check list of the butterflies of Manitoba.

p. 33, line 2. For "eurytheme f. *eriphle* Edw. Gen. Dist.", read:

eurytheme ab. ♀ *alba* Stkr. Tr., VB., Wg., Ft.A., Beu., Bir.

p. 33, line 41. For "uhleri varuna tr. f. *dennisi* Gund. Beulah" (which is repeated in the following line), read: *uhleri varuna* Edw. Aw., Beu., Bir.

p. 33, line 48. For "theano canadensis f. ♀ *churchillensis* Warr. Ch." (which is repeated in the following line), read: *theano canadensis* Warr. Ch.

p. 34, insert following line 5: *aphrodite cypris* ab. *mayaec* Gund. Kelwood.

Ohio
Sci. Jour.
v
J
O
O
P
C
T
B
A
S
H
C
A
D

, 1942

ed in
reated

al
urnal
at.
v
oo
p
ct
s
t
a
sh
ca
11